much new light upon them. The contrast between the handsome and comparatively fair Reshiats and the ill-favoured and artificially deformed Buma and Marlé people is singularly marked, although the tribes reside near each other. The Buma-Marlé women wear lip ornaments, closely resembling those of the Botocudo and other savages of the Amazon basin. Dwelling on the west side of Lake Rudolf, the Turkana tribes set some of the most curious fashions in hair-dressing that even the African mind has devised.

For some time to come this district, first entered by Count Teleki and Lieut. von Höhnel, will be the base for new exploring journeys of high importance; but it is difficult of access, and all those who have tried to follow in the footsteps of the pioneers, have so far been obliged to turn back unsuccessful. H. R. M.

THE BEETLES OF NEW ZEALAND.[1]

TIMES have changed since the founders of entomology considered it sufficient to use the words "in Indiis," when they were unacquainted with the locality of an insect they were describing; nor would it be possible now to publish a volume of "Insects of India," like Donovan's, issued no longer ago than the beginning of the present century, in which many of the species represented on the plates are conspicuous South American or African butterflies. At present it is hardly considered lawful to describe an insect without an exact locality, and the number of species has increased to an extent of which the older entomologists never dreamed. We cannot at present be acquainted with much fewer than 300,000 species of insects from all parts of the globe, and yet none but a few, even among entomologists themselves, have any conception of how much yet remains to be done before our knowledge of the insects of the world can be considered anything like complete; and some entomologists of great experience now mention ten millions as a mere guess at the approximate number of existing species.

But our knowledge of the insects of various countries is now being largely extended by the publication of local monographs of different groups of insects, mostly, but not always, relating to the *Lepidoptera*. These monographs are of the greatest value as a basis for future research, and are especially important in the case of island for several reasons.

Firstly, an island has a restricted area, and hence its fauna forms a compact whole; nor can there usually arise much difficulty in ascertaining what species are really indigenous.

Secondly, from the restricted area of islands, and the facilities they offer for colonisation and cultivation, the bulk of the native fauna and flora is peculiarly liable to be exterminated, not merely from the advance of cultivation, with its usual accompaniments of clearing of forests and drainage of marshes, but from the irruption of powerful competitors in the shape of dominant, if not almost cosmopolitan species from abroad.

Thirdly, many insular species, especially in the case of oceanic islands, are endemic, being peculiar to the locality, and found nowhere else in the world, and are thus liable to be lost to science for ever. Nor are we yet in a position to estimate the value of such species. It is even not impossible that in some cases, at least, they may be the last remnants of the productions of some long-vanished continent, and they may some day prove of service in helping us to map out the rough features of the former geography of the world.

The volume before us, although issued as parts v., vi., and vii. of Captain Broun's "Manual of New Zealand *Coleoptera*," is really a supplement to the well-known and extremely useful work published by the Geological Survey and Museum Department between 1880 and 1886. These parts, issued as i.-iv., comprised 973 pages, and included descriptions of 1756 species. The present supplement continues the pagination to 1504 pages, and includes descriptions of 836 new species, thus raising the number of New Zealand beetles to 2592; and Captain Broun considers that over 700 species still remain undescribed. It will therefore be seen that, notwithstanding the extremely insular character of the New Zealand fauna, there is every reason to believe that the number of species of *Coleoptera* will ultimately far exceed that of our British beetles, which are not now considered to amount to quite 3000 species.

Dr. Hector, the Director of the Colonial Museum, Wellington, remarks, in his preface to Capt. Broun's work:

"Of the present additions, 660 have been described by Captain Broun, 172 by Dr. David Sharp, four by Mr. Matthews, and one by M. Fauvel; and in order to place these species in proper systematic position, Captain Broun has found it necessary to establish several new genera."

It is impossible to criticise a work like this, consisting almost entirely of technical descriptions of genera and species. A very few corrections to the former parts of the work are prefixed to this volume, in addition to a not very formidable list of errata. It is obvious that there could be no room in a book of this kind for more than a few of the most important comments which might be made on the earlier portions.

There is a good systematic index at the beginning of the volume, and we do not think that as there is no synonymy, the absence of an alphabetical index is of any importance. But we should have liked to have seen an index of localities, for although the places mentioned may be, and probably are, familiar to New Zealand colonists, yet other coleopterists may wish to know, at least, in which island each insect was taken; and in the case of mountain species, the approximate altitude, if known, should be recorded. We cannot have too much or too exact information on matters of this kind. W. F. KIRBY.

NOTES.

THE preliminary arrangements for the seventh International Congress of Hygiene and Demography, to be held at Budapest from the 1st to the 9th of next September, are well advanced, as many as 440 papers having already been promised. Most of these treat of hygienic subjects, but 78 papers are devoted to demography. The Congress will be opened by the Archduke Karl Ludwig.

THE Government has decided to place the direction of the Customs and Inland Revenue Laboratories under one administrative chief, to be styled the Principal Chemist of the Government Laboratories. The Principal Chemist will also receive references from the Board of Agriculture, the Local Government Board, and other Government departments. The appointment, which is in the gift of the Treasury, has been offered to, and has been accepted by, Prof. Thorpe, F.R.S., who thereby vacates the Chair of Chemistry in the Royal College of Science, which he has held since 1885.

DR. ARTHUR W. BISHOP, late Assistant Professor at the Heriot-Watt College, Edinburgh, has been appointed, by the Secretary of State for India, Professor of Chemistry in his Highness the Maharajah of Travancore's College at Trivandrum, Travancore.

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[1] "New Zealand Institute. Manual of the New Zealand Coleoptera." By Captain Thomas Broun. Parts v., vi., vii. Published by the Board of Governors. Wellington, New Zealand. (Government Printing Office: Samuel Costall, 1893.)

Dr. W. J. Russell, F.R.S., has been elected President of the Institute of Chemistry, in succession to Dr. W. A. Tilden, F.R.S.

Dr. F. Dahl has been appointed Professor of Zoology, and Dr. F. Shütt Professor of Botany, in Kiel University.

Dr. K. Auwers, Privat-docent in Heidelberg University, has been appointed Professor of Physical Chemistry.

A collection of botanical specimens from the Pamirs, made by Captain Younghusband, has been added to the Herbarium at the Saharanpur Government Botanical Gardens.

The *Pioneer Mail* says that direct telephonic communication was established between Calcutta and Nagpoor, a distance of 750 miles, on February 18. Messages were successfully interchanged between the two stations.

It is said that negotiations are in progress between Dr. Billings, on behalf of the United States Surgeon-General's Office, and the family of the late Prof. August Hirsch, of Berlin, for the purchase of the library left by the latter, which consists of about 10,000 volumes.

Gales or strong winds have occurred with great persistency over our Islands during the past week. On Saturday morning, the 10th instant, a storm centre lay off the north of Scotland, and between that time and Sunday morning a very severe gale was experienced in the north and west, while upwards of an inch and two-tenths of rain fell at Stornoway. On Monday afternoon another severe storm reached our south-west coasts, and on the succeeding night passed in a north-easterly direction to the North Sea. This disturbance was also accompanied with heavy rainfall at many places; at Holyhead it amounted to three quarters of an inch. The rainfall lately in Scotland has been greatly above the average; the excess in the north of Scotland is 8·6 inches since the beginning of the year.

The report of the Berlin branch of the German Meteorological Society for the year 1894 contains an investigation by its President, Prof. G. Hellmann, on the temperature in and outside the town of Berlin. The influence of a large number of houses on the temperature is very marked, and Dr. Hellmann has been at great pains to secure trustworthy results; the instruments are carefully compared and exposed at several stations in properly constructed screens, and are in charge of persons interested in the work. The mean yearly temperature in the town is found to be nearly 1° higher than in the suburbs, the greatest difference occurring in the warmer season (March to August), and the least during winter. But in time of severe frost the difference has amounted to as much as 14°. The greatest variation naturally occurs in the evening, when the houses radiate the heat obtained during the day-time; in summer time this difference amounts to 2° or more, and on calm evenings may even amount to more than 5°; the temperature curve inside compared with that outside the town shows quite a different rate of fall.

A paper on the Texan monsoons was recently read before the Philosophical Society of Washington by Prof. M. W. Harrington. In order to ascertain the existence, locality, and character of recurring winds, maps were constructed from the tri-daily observations of the Weather Bureau, to exhibit the most frequent winds for each month of the year, and these maps showed a distinct seasonal change in wind direction in several localities of the United States. The southerly winds, or summer monsoons, in Texas first appear distinctly in March, and their area is most extensive from May to October, when it occupies about 500 miles in longitude and about 1000 miles in latitude, extending to the Canadian boundary. The northerly winds or winter monsoons first appear distinctly in December, and continue until the end of February, occurring for the most part under anticyclonic conditions to the north of Texas. They sometimes combine with the well-known "northers," causing a great fall of temperature. These monsoon winds play a very important part in the climate of Texas; the southerly winds bring coolness when it is most needed, while the northerly winds, although not so favourable, are not less so than the prevalent westerly winds to the northward of that State.

That the luminosity of a candle can be calculated direct from the dimensions of its flame, is the rather striking theorem of Herr P. Glan, who gives the results of his measurements in the current number of *Wiedemann's Annalen*. The volumes of the bright portions of various candle flames were measured by taking the length by means of a scale placed behind the flame, and the breadth at various points by gauging it with calipers or compasses. These bright portions have approximately the shape of cones, each of these cones being penetrated from below by a truncated cone, consisting of the dark central portion. The difference between the volumes of the two cones gave the volume of the brilliant portion. Stearine and paraffin candles of various thicknesses, and provided with different wicks, were compared by means of a rod photometer. It was soon found that the height of the flame was not the only factor determining the brightness. A stearine candle of 5·88 cm. circumference had, on the other hand, a higher luminosity than another 6·49 cm. in circumference. But a determination of the ratio of the volume to the illuminating power showed that this ratio is very nearly constant, the difference between the actual luminosity and that calculated from its volume never exceeding 3 per cent. In other words, equal volumes of the bright flame of any two candles give out the same amount of light.

At a recent meeting of the Société Française de Physique, Dr. d'Arsonval exhibited a new form of electrical machine which has been devised by M. Bonetti. The machine is a modification of the ordinary Wimshurst pattern, the improvements introduced by M. Bonetti consisting in the suppression of the metallic sectors and the replacement of the single brushes at the extremities of the transverse conductor by three at either end. As a result of these changes, the output of the machine, and the length of spark it is capable of giving, are both increased. If two similar machines are taken, one having metallic sectors and the other without, and the output is measured with a Lane's jar, it is found that the machine without sectors gives an output from two to four times as great as the ordinary form. Another advantage possessed by the new form of machine is that it is not subject to a change in polarity while at work. Although the machine is not self-exciting, it can be started by placing the finger against the upper part of one of the rotating discs while it is in movement. If it is desired to change the polarity of the machine, it is only necessary to place the finger at the same part of the opposite disc.

In a second paper, on the polarisation upon a thin metal partition in a voltameter (*Philosophical Magazine*, March 1894), Mr. John Daniel discusses the passage of ions through a gold-leaf partition, and also the minimum current-strength at which the ions are deposited visibly upon the partition for various electrolytes. In order to investigate the first point two similar voltameters with metallic partitions were set up at the same time, and, without passing the current quantitative analyses of the solution on the two sides of the partition, were made at stated intervals; then the current was passed, the voltameters being in series, quantitative analyses being again made of the solution on the kathode side, and the weight of copper deposited on the kathode determined, and finally the circuit was broken and the analyses again repeated. Curves plotted from these results show no break nor change of slope for the intervals during which the current was passing. Thus it would appear that the current does not sensibly affect the diffusion of copper sulphate and sulphuric acid through a gold-leaf partition. In the experiments on the "critical current" it was found that the concentration of the electrolyte exerted an important influence on the value obtained, and the measurements made indicate that the "critical current" is proportinal to the conductivity of the electrolyte. Experiments made to determine whether the variation of the temperature has the same effect upon the "critical current" as upon the conductivity, are not yet sufficiently complete to justify conclusions being drawn.

Mr. Henry Gannett, of the United States Geological Survey, has published the results of his calculation of the average elevation of the United States with a magnificently-coloured contour-map of the whole area on the scale of about 100 miles to an inch. The contouring is in large part hypothetical, but the discussion takes all considerations into account in order to present the results as accurately as possible. It is estimated that the mean elevation of the United States is 2500 feet, a little greater than Dr. Murray's estimate of the mean elevation of the land of the globe. Delaware is the lowest State, averaging only 60 feet above sea-level, while Wyoming and Colorado are the highest, respectively 6700 and 6800 feet. Eleven States are above the average level, all being on the Pacific coast or in the adjacent Cordillera region. Florida and Louisiana are the least elevated States next to Delaware, being only 100 feet in average height. In making these calculations the levels of railway lines were extensively utilised to supplement the somewhat scanty determinations of altitude made by official surveyors.

The few regions of Europe still unexplored formed the subject of consideration at the last meeting of the Royal Geographical Society, when Mr. W. H. Cozens-Hardy described his recent journey through Montenegro and the borders of the adjacent Turkish provinces of Albania and Novi-Bazar. Mr. Cozens-Hardy has been able for the first time to map accurately the frontiers of Montenegro as defined by the Treaty of Berlin, and he succeeded in gaining the good-will of the people, penetrating for some distance into Albania, where the practically independent tribes still make travelling dangerous. The northern and eastern parts of Montenegro consist of grassy mountains, forests, and fertile valleys, contrasting with the bare rocky hills and river-basins of the coast region and the centre.

Three Norwegian whalers have attempted seal fishery in the Antarctic waters south of the Falkland Islands during the southern summer now ending. One of these vessels was as far south as 69° or 70° without finding enough ice to make sealing profitable, and it is reported that a considerable extent of new land has been discovered and charted.

The botanical collections made by Messrs. Burk and W. E. Meehan during the Peary expedition, are described in the *Proceedings* of the Philadelphia Academy, under the title "Contribution to the Flora of Greenland." One hundred species of flowering plants and vascular cryptogams are enumerated, thirty-nine of lichens, and twenty-eight of mosses.

Herr S. Csapodi records in the *Sitzungsberichte* of the *Ungarische naturwissenschaftliche Gesellschaft von Budapest*, the curious fact that several mould-fungi, especially *Mucor Mucedo*, will grow on solid compounds of arsenic, giving off arsenical vapours. This may be compared with Zukal's observation of the growth of *Halobyssus moniliformis* in a saturated solution of sodium chloride, and the existence of living fungi in solutions of salts of copper.

Sir Douglas Galton calls attention to an important and extensive investigation being carried out by the committee on the mental and physical condition of children, of which he is the chairman. About 50,000 school children have been seen individually, and from the notes taken it appears that about seven per cent. were mentally dull, and that sixteen per 1000 require special care and training. It is proposed to report upon 100,000 children if the necessary funds are forthcoming, and for this an appeal is made to all who, while desiring progressive education, also desire that the training of children should be conducive to the development of both sound bodies and brains.

Mr. C. A. Barber, Superintendent of Agriculture for the Leeward Islands, contributes to the *Leeward Islands Gazette* a report on the diseases of the sugar-cane in the West Indies. It refers chiefly to the insects which attack the canes, the various stages of the different species being described and figured. The *Kew Bulletin* for March contains also a correspondence on the subject between the Director of the Gardens and the Director of Forests and Gardens for Mauritius. This refers to the destruction of the crop by the parasitic fungus *Trichosphæria Sacchari*, which has apparently been introduced into Mauritius from the West Indies.

The *Journal* of the Royal Asiatic Society of Bengal for November 27, 1893, contains an interesting article on the "Blind Root-suckers of the Sunderbans," a tract of swampy littoral forest occupying the southern portion of the Delta of the Ganges. A large number of the trees which inhabit this area are furnished with root-suckers in the form of woody processes growing in an upward direction, and developed at irregular distances along the whole course of the roots. They project from one to three feet above the surface of the ground, and apparently cease to grow when the apex has reached the level of the highest spring-tides. The main object of these structures is to protect the tree against the uprooting effect of violent winds in the swampy soil; but they also contain a system of air-chambers for the aeration of the root. They never produce buds.

Readers of Hermann Müller's "Die Befruchtung der Blumen," or its excellent translation by Prof. D'Arcy Thompson, will remember its opening sentence: "It was not until the close of the last century that the true purport and significance of flowers began to be perceived. Christian Conrad Sprengel seems to have been the first to view the subject in the light of adaptation, and to show how all the colours, scents, and singular forms of flowers have some useful purpose. His book struck out a new path in botanical science, and its title, 'The Secret of Nature revealed in the Formation and Fertilisation of Flowers,' shows that the author was well aware of the importance of his discoveries." This work of Sprengel's, "Das entdeckte Geheimniss der Natur im Bau und in der Befruchtung der Blumen," was published in Berlin in 1793, and for many years has been an exceedingly rare and costly book. In spite of the teleological standpoint of all Sprengel's researches, it will always be a book of interest and of reference; we are therefore glad that advantage has been taken of the centenary of its appearance, to bring out a facsimile reprint, which has just been published as one of Mayer and Müller's "Wissenschaftliche Classiker in Facsimile-Drucken." The volume contains 224 quarto pages and twenty-five plates, and costs only eight marks.

In a paper, "Influenza della luce solari sulle acque di rifiuto," Dr. Procacci contributes to the *Annali dell' Istituto d'Igiene Sperimentale di Roma*, vol. iii. p. 437, the results of his numerous investigations on the bactericidal action of sunshine on the microbes normally present in drain-water.

Cylindrical glass vessels about 60 c.m. high and 25 c.m. wide were employed; from some of these the light was excluded, whilst in others it was allowed free access. The temperature of the latter never exceeded that of the former by more than from 2°–4° C., and in neither case did it ever extend beyond from 40°–42° C. In every instance a marked diminution in the bacterial contents was observed in the insolated vessels, whilst at the same time a more or less marked increase took place in those protected from the sunshine; the period of exposure varied from one and a half to nine hours. Of particular interest are the investigations made to ascertain to what depth in the water the antiseptic action of the sun's rays extended. It appears that when the vessels were exposed to the perpendicular as well as the oblique rays of the sun, the bactericidal power of insolation was unimpaired at the bottom of the vessel, a depth of half a metre; but when the perpendicular rays only were admitted, no diminution took place in the number of bacteria present at this distance from the surface. That the oblique rays rendered important service in the destruction of the micro-organisms was further shown by a special bacterial examination of portions of the liquid in the immediate vicinity of the sides of the cylinder, for when the latter was freely exposed to sunshine, the smallest number of microbes was found in those parts of the liquid which were nearest to the walls of the vessel. Dr. Procacci, in summarising his results, expresses his belief that the bacterial purification which takes place during a river's course may in many cases, where the rate of flow is presumably too great to admit of sedimentation taking place, be attributed directly to the destructive action of sunshine on the suspended microbes.

THE *Psychological Review* for March contains several important papers, among them being one on reaction-times and the velocity of the nervous impulse, by Profs. C. S. Dolley and J. McKeen Cattell. The object of the authors' investigations was to determine the conditions which affect the length of reaction-times on dermal stimuli, and to study the application of the reaction-time to the measurement of the velocity of the nervous impulse in motor and sensory nerves, and in the motor and sensory nerves of the spinal cord. For the application of the stimuli, two points were chosen on the arm over the median nerve, and two on the leg over the posterior tibial nerve. The points on the arm were 30 cm. apart, and those on the leg 50 cm. apart, and the length of intervening nerve would be nearly the same. It was found that the reaction-times were longer when the stimulus was applied to the lower points on the arm and leg than when the points less distant from the brain were used. If the difference of time is really due to the difference in length of the nerve traversed, the velocity of the impulse in the sensory nerve is 21·1 metres and 49·5 metres per second, respectively, for the two observers. The velocity in the sensory fibres of the posterior tibial nerves was 31·1 metres per second for Prof. Dolley, and 64·9 metres per second for Prof. Cattell. This large difference between the two observers, however, is attributed to differences in the cerebral processes rather than to differences in the velocity of the impulse in the sensory nerve. In the case of reaction experiments with dermal stimuli the electric shock was mostly used, but as the physiological effects of the shock were found to vary greatly on different parts of the body, a method was devised for applying a touch or a blow. It was found that the same objective force of blow was followed by the same subjective sensation more nearly than in the case of electrical stimulation. From the difference in the reactions on touch when the stimulus was applied to the arm and to the thigh, the velocity of the nervous impulse in the sensory tracts of the spinal cord was determined as about 40 metres per second.

MESSRS. R. FRIEDLÄNDER AND SON, of Berlin, have sent us a set of their "Naturæ Novitates," issued during the last four months. The circulars contain lists of current scientific literature, the works being classified according to subjects.

THE Director of the Botanical Survey of India has published two valuable additions to our knowledge of the flora of British India: a report on a botanical tour in Kashmir, by Mr. J. F. Duthie, and a report on a botanical tour in Sikkim, by Mr. G. A. Gammie.

WE have received a fresh instalment (Band 3, 2^{te} Hälfte, 2^{te} Lieferung) of Cohn's *Kryptogamen Flora von Schlesien*, which includes the Tuberinei, Elaphomycetes, Saccharomycetes, and the commencement of the Pyrenomycetes. Two new genera and several new species are described.

A REPORT on North-Western Manitoba, and portions of the adjacent districts of Assiniboia and Saskatchewan, drawn up by Mr. J. B. Tyrrell, has been published by the Geological Survey of Canada. The report is accompanied by two maps, one showing the geology of the region, and the other the distribution and character of the forests.

IN the *Proceedings* of the Geologists' Association (vol. xiii. part 6) Mr. A. Smith Woodward briefly reviews the present state of knowledge of the sharks' teeth met with in British Cretaceous formations. The review is illustrated by two admirable plates, which will be of use to collectors; and several of the specimens described add something of importance to the facts previously known.

MM. RICHE AND ROUME contribute to the *Annales des Mines* (sér. 9, tome v., Liv. 1, 1894) a general account of the petroleum industry of the United States, the result of a visit to the districts made by the authors in 1892. The article deals in great part with the methods of refining, comparing them with processes used in France; but it also contains descriptions of the production areas in the Eastern States, and gives an interesting map of Pennsylvania showing the gas and oil districts.

MESSRS. SWAN SONNENSCHEIN AND CO. will shortly publish a new book by Mr. J. W. Tutt, under the title of "Woodside, Burnside, Hillside and Marsh." This will consist of a series of illustrated literary sketches, on somewhat similar lines to the author's "Random Recollections of Woodland, Fen and Hill," and will describe a series of natural history rambles in various parts of Kent and the Scotch Highlands, dealing with various branches of natural science in a popular way.

THE fourteenth volume of the Index-Catalogue of the Library of the Surgeon-General's Office, U.S. Army, has been issued. The volume comprises words between "sutures" and "universally." It includes 10,124 titles, representing 6426 volumes and 8850 pamphlets. In addition to this bulk of matter, there are 9867 subject-titles of separate books and pamphlets, and 38,461 titles of articles in periodicals. When the catalogue is completed, it will literally represent a solid monument to industry.

THE first of a series of monthly guides to the beauties of animate nature has been published by Messrs. Bliss, Sands, and Foster, under the title "The Country, Month by Month." Mr. J. A. Owen and Prof. G. S. Boulger are the authors of this little book, which will be followed by others, each devoted to a particular month of the year. The descriptions are interesting and brightly written, and dwellers in towns who read them will assuredly be tempted "to put forth and brave the blast" of this blustering month of March in order to see the woodlands returning to life.

WE have on several occasions referred to the interesting series of reprints being published by W. Engelmann, Leipzig. One of the latest additions to the series is "Electrochemische Untersuchungen," edited by Prof. Ostwald, and containing Sir Humphrey Davy's Bakerian Lectures of 1806 and 1807, dealing with chemical changes produced by electricity (*Philosophical Transactions*, 1807 and 1808). Another reprint just received is Brücke's observations on the colour-changes of chameleons, originally published in 1852 under the title "Untersuchungen über den Farbenwechsel des Afrikanischen Chamäleons." The editor of this reprint is Dr. M. v. Frey.

WHAT is written by Dr. Paul Carus in a "Primer of Philosophy," published by the Open Court Publishing Co., Chicago, is written clearly. The book does not set out the ideas of any particular school of recent thought, but is rather "a critical reconciliation of rival philosophies of the type of Kantian apriorism and John Stuart Mill's empiricism." At the present time the man of science frequently ignores philosophy, and the cause of true science is injured thereby. Dr. Carus shows, however, that as all the sciences are inseparable from each other, so philosophy is inseparable from the sciences. When this truism is more widely recognised, a new vista will be opened to us, in which the old and the new scientific methods will be happily combined.

WE have received a copy of the official organ of the National Department of Hygiene in the Argentine, which is published weekly at Buenos Ayres, under the direction of the President of the Department, Dr. José M. Ramos Mejía. Besides containing original memoirs, it is intended to give, in a concise and handy form, abstracts and reviews of the more important papers on subjects connected with hygienic science which have appeared in foreign journals. We find in the present number an account of work recently published in the *Deutsche Medicinal Zeitung*, the *Therapeutic Gazette* (Philadelphia), the *Zeitschrift für Hygiene*, the *Revue Internationale de Bibliographie Médicale* (Paris), &c. The abstracts are not bare outlines, but are very full, containing elaborate tables and many details of the experiments described.

THE maps and plans illustrating the Report of the Royal Commission on Metropolitan Water Supply have now been issued. Of most general interest are a contoured map of the Thames Basin, and a geological map of the same area, reduced from the Geological Survey map. Both sheets are on the scale of four miles to one inch; the latter is illustrated by three geological sections. Diagrams are given of the flow of the Thames and Lea; rainfall and percolation at Lea Bridge; gaugings of the Chadwell Spring; quantity of water purified from the wells of the New River Company. There is also a map of Hertfordshire illustrating Mr. R. S. Middleton's special report to the Commission, which shows the underground water-contours, and a map by Mr. G. J. Symons showing the rainfall in the basins of the Thames and Lea. There are in all fourteen plates.

COLLECTIONS of aphorisms do not appeal very favourably to us, for the reason that they are apt to create a "conceit of knowledge." The tendency of to-day is to be content with bits of information on diverse subjects, and to eschew the steady reading necessary for a clear understanding of anything. A further objection is that it is extremely difficult to select extracts which give a true impression of the author's meaning. This has been done, however, by Miss J. R. Gingell, in "Aphorisms from the Writings of Mr. Herbert Spencer," published by Messrs. Chapman and Hall. The selections deal with education, evolution, science, sociology, politics, justice, liberty, truth and honesty, sympathy, happiness, self-control, &c. They are well arranged and to the point, and illustrate the scope of the synthetic philosophy. Miss Gingell's volume may therefore serve a useful purpose by presenting in a handy form Mr. Spencer's views on many subjects.

MR. J. E. WALKER defines his "Voices of the Stars" (Elliot Stock) as "a book of scientific facts and of mystical correspondences between the natural and the supernatural." Just as in early records we find that many peoples have endeavoured to accommodate natural phenomena to the prevailing type of religion, so Mr. Walker finds that the facts of astronomy suggest spiritual similarities. His book is very largely made up of extracts from the works of various astronomers, all the sources of information being acknowledged in foot-notes. The compilation shows clearly that the author is in touch with recent advances, and is capable of properly estimating the weights of the words and works of different observers. We cannot enter much into his spiritual interpretations of astronomical marvels, though the book abounds with such comparisons of the material and immaterial. To our mind, however, the analogues are frequently far-fetched and never impressive. By all means let life be put into what are often regarded as the dry bones of science; but it may be doubted whether dogma is able to assist in the resuscitation.

THE observations made at the Blue Hill Meteorological Observatory, Mass., in the year 1892, have recently been published as vol. xl. part ii. of the *Annals* of the Astronomical Observatory of Harvard College. There is an appendix giving particulars of experiments on atmospheric electricity. The volume concludes with an article on sudden changes of atmospheric temperature, in which it is suggested that there is a meteorological period as well as a magnetic one corresponding to the period of the sun's rotation.

A USEFUL contribution to our knowledge of the tropical hurricanes of the South Sea, between Australia and the Paumotu Islands, appears in *Aus dem Archiv. der Deutschen Seewarte* for 1893, by E. Knipping, formerly Director of the Meteorological Observatory at Tokio, Japan. It contains a list and short description of all storms observed since 1789, with references to the sources whence the information has been obtained, and the frequency of the hurricanes and their paths are plotted in five-degree squares. Of 125 hurricanes on which the discussion is based, 109 occur between December and March, 12 in April and November, and 4 in September, October, and May. Near the Fiji Islands the number of storms increases regularly from December to March, but near New Caledonia and the Samoa Islands the majority occur in January. The prevalent direction of their course is south-easterly, while others take a southerly and south-westerly direction. Some useful hints are also given as to the courses to be steered by vessels overtaken by the hurricanes.

DR. ALFRED KOCH'S *Yahresbericht über die Fortschritte in der Lehre von den Gährungs-Organismen* for 1892 has just been published. This is the third year of its issue, and affords an invaluable volume not only for purposes of reference for those engaged upon the original work on, but also for those interested in the history and literature of, the important subject of fermentation. Under the respective headings of i. Lehrbücher, Zusammenfassende Darstellungen, &c.; ii. Arbeitsverfahren, Apparate, &c.; iii. Morphologie der Bakterien und Hefen; iv. Allgemeine Physiologie der Bakterien und Hefen; v. Gährungen in Besonderen; vi. Fermente—are to be found notices of, and excellent abstracts of the more important original memoirs published during the year. It is, in fact, a record of scientific progress, not only in the department of fermentation, but also in other branches of bacteriology more or less closely connected with it. The work is admirably done, and it is to be hoped that Dr. Alfred Koch will find sufficient support to ensure its continuation for many years to come. We would, however, suggest that its value for purposes of immediate reference would be greatly enhanced by its publication being more prompt.

The additions to the Zoological Society's Gardens during the past week include a Wild Cat (*Felis catus*) from Inverness-shire, presented by Mrs. Ellice; a Solitary Thrush (*Monticola cyanus*) European, presented by Mr. J. Young; a Diana Monkey (*Cercopithecus diana*, var. *ignitus*, ♀) from West Africa, deposited; three Alpine Accentors (*Accentor collaris*), a Bluethroat (*Cyanecula suecica*) European, purchased.

OUR ASTRONOMICAL COLUMN.

A New Achromatic Object-glass.—It is well known that in consequence of the irrationality of dispersion the nominally achromatic object-glass is really very far from achromatic. There is always a residual colour, frequently called the secondary spectrum, so that the images of bright stars are surrounded by halos of blue and red light. For this reason a refracting telescope designed for visual observations cannot be employed for photography. Many attempts have been made to correct this colour aberration of the achromatic lens, but the plans hitherto suggested have never been practically adopted, owing to difficulties of construction, or to the imperfect durability of the glasses employed. Mr. H. D. Taylor, optical manager to Messrs. T. Cooke and Sons, has recently taken up the question, and he appears to have come very near to a practical solution of the problem. He has aimed at producing an objective which shall be (1) almost perfectly achromatic; (2) equally well corrected for photographic purposes as for visual purposes; (3) capable of practical construction in large sizes; and (4) of ordinary durability.

The new object-glass which is to satisfy these conditions is a combination of two positive lenses and one negative lens, each made of a kind of glass possessing different optical properties. The necessary glasses are manufactured by Messrs. Schott and Gen, of Jena, and there is no reason to believe that there will be any difficulty in the production of large discs. The separate lenses are so constructed that the partial dispersions of two of the lenses combined are as nearly as possible equal to those of the third lens when acting singly. It is calculated that with the kinds of glass actually available the greatest departure from focus in the case of a 12-inch object-glass of 15 feet focus would be about 0·06 inches for the H rays, or only $\frac{1}{14}$ that in an ordinary object-glass of similar dimensions. The curvatures of the lenses are designed to minimise the difficulty of practical construction and testing, and no important loss of light is anticipated from the increased thickness of glass which the new object-glass requires. Indeed, it is probable that there will be a considerable gain of light-gathering power from the convergence of all the luminous rays to a common focus. (Full particulars are given in the Patent Specification, No. 17,994, 1892.)

Solar Magnetic Influences on Meteorology.—Under this title Prof. H. A. Hazen has published a pamphlet dealing with the supposed existence of electric or magnetic fields in the atmosphere, and the possibility of their accounting for weather phenomena. The subject has for some time been under investigation by Prof. F. H. Bigelow, and papers upon it have been published by the United States Weather Bureau, and in several American journals. Prof. Bigelow considers that under certain conditions of the sun there would be generated two distinct magnetic fields—one from the photosphere, and one from the nucleus, the earth being traversed by at least three fields of magnetic force: the lines of permanent magnetism, those from the electro-magnetic or radiant field, and those from the magnetic or coronal field. The radiant field would be favourable to producing warm, dry, high-pressure areas, as seen in the tropical belt, while the magnetic polar field would be favourable to the production of cold, dry, high-pressure areas, such as frequent the storm-belts farther north. It is with the latter influence that we have chiefly to do, in which Prof. Bigelow detected systematic changes recurring in about twenty-seven days. On projecting temperature curves for different parts, according to this magnetic ephemeris, he found *inter alia* that there is a continual lag in the time at which the maximum and minimum points of the curve reach the stations lying to the eastward, *e.g.* a minimum point in the curve in the eastern part of the country corresponds to a maximum point in the west, and *vice versâ*. Prof. Hazen puts these theories to various tests, amongst them the passage of hot and cold waves across the United States, and he concludes that the outcome of these investigations must be a "bitter disappointment" to those who believe in an all-important influence, aside from heat, from the sun upon our weather changes. He admits that there is undoubted evidence that some influence does exist, but at present it appears to be masked by terrestrial conditions, which have yet to be studied and eliminated.

A New Telescope for Greenwich.—The *Observatory* announces that Sir Henry Thompson has offered the magnificent sum of £5000 to the nation, through the Astronomer Royal, for the purpose of buying a telescope for Greenwich Observatory. The instrument is to be expressly designed for photographic purposes, and, subject to the acceptance of the offer by the Government, will have an aperture of 26 inches. It will be made from the model of the equatorials used for the photographic chart of the heavens, but with double the dimensions of those telescopes. The guiding telescope will be the $12\frac{3}{4}$-inch Merz refractor, with a light tube. It is intended to house the new instrument under the Lassell Dome, on the top of the central octagon of the new Physical Observatory, now being built in the south grounds of the Royal Observatory.

Occultation of Spica.—On the morning of Good Friday the bright star Spica will be occultated by the moon. At Greenwich the disappearance takes place at 4.5 a.m. at the position angle 123°, and the star will reappear at 5.13 a.m. at position angle 297°, the angles being read from north in the direction north, east, south, west. The occultation will be visible at places between latitudes 79° north and 16° north, which are not too far from the meridian of Greenwich. The moon will be a little past full at the time.

New Nebulæ.—Dr. Max Wolf announces in *Astr. Nach.* 3214, that several new nebulous patches appear upon photographs of the regions round β and δ Cassiopeiæ, taken at the end of last year and the beginning of this, with exposures of about sixteen hours. Three of these spots have the following positions:

	h. m.		′
R.A. ...	0 49 0	Decl. ...	60·20
,, ...	0 51·9	,, ...	60·5
,, ...	1 38·0	,, ...	59·5

THE MINUTE STRUCTURE OF THE NERVE CENTRES.

The Croonian Lecture was delivered by Prof. Ramon y Cajal at the Royal Society on March 8. After giving a short historical survey of his subject and referring to the work of Kölliker, His, Van Gehuchten, Waldeyer, Edinger, Von Lenhossék, A. Sala, P. Ramon, and Retzius, Prof. Cajal proceeded to give an account of his own work, and pointed out in what particulars his results differed from those of Camilo Golgi, the originator of the silver impregnation method. Golgi had shown that the protoplasmic expansions of nerve cells terminate by free extremities in the grey matter, that the prolongations of the nerve cells give off in their course through the grey matter very fine ramifying collateral branches, and that two types of cells may be distinguished—a motor type, distinguished by an unbranched axis cylinder, which becomes continuous with a fibre in the white matter, and a sensory type, distinguished by possessing an axis cylinder which on leaving the cell divides so freely that its individuality is lost as it ramifies in the grey matter. Within the grey substance a network of fibres is formed by the terminal twigs of centripetal nerve fibres, ramifications from the network derived from sensory cells, and collaterals of protoplasmic processes of motor cells.

Passing on to the results of his own work, Prof. Cajal showed that axis cylinders, in addition to the protoplasmic prolongations, end by free terminations in the grey substance. He does not admit that there is any sharp functional difference between the